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Leu Val Pro Ser Ser Glu Gln Gln Val Val Asn Ser Leu Ala Asp Asn		
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Leu Asp Ile Gln Tyr Glu Val Leu Thr Asn His Gly Ala Asn Glu Gly		
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ctt gcg tgc caa gat atg ggc gca gaa tgg gct tct tgt aac aaa gta		192
Leu Ala Cys Gln Asp Met Gly Ala Glu Trp Ala Ser Cys Asn Lys Val		
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aac atg acg ctt gtt aac caa ggt gaa gct gtt gac tca aaa gat tgg		240
Asn Met Thr Leu Val Asn Gln Gly Glu Ala Val Asp Ser Lys Asp Trp		
65 70 75 80		
gct att tac ttc cac agc att cgt ctg att ctg gat gtt gac aac gag		288
Ala Ile Tyr Phe His Ser Ile Arg Leu Ile Leu Asp Val Asp Asn Glu		
85 90 95		
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Gln Phe Lys Ile Ser Arg Val Thr Gly Asp Leu His Lys Leu Glu Pro		
100 105 110		
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Thr Asp Lys Phe Asp Gly Phe Ala Ala Gly Glu Glu Val Val Leu Pro		
115 120 125		
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Leu Val Gly Glu Tyr Trp Gln Leu Phe Glu Thr Asp Phe Met Pro Gly		
130 135 140		
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Ala Phe Val Ser Ala Pro Asn Ala Glu Pro Lys Met Ile Ala Ser Leu		
145 150 155 160		
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Asn Thr Glu Asp Val Ala Ser Phe Val Thr Gly Leu Glu Gly Asn Asn		
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cta aaa cgt aca cca gat gac aac aat gta ttt gca aac gct gtg tct		576
Leu Lys Arg Thr Pro Asp Asp Asn Val Phe Ala Asn Ala Val Ser		
180 185 190		

DRAFT - 03/2008

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tta cta cca aca cca atg cac gtt gaa gcg ggt aaa ggc aaa gta gat Leu Leu Pro Thr Pro Met His Val Glu Ala Gly Lys Gly Lys Val Asp 210 215 220	672
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gaa tta gca aaa tct ggt gct tac gaa atg agc atc aaa ggc gac ggt Glu Leu Ala Lys Ser Gly Ala Tyr Glu Met Ser Ile Lys Gly Asp Gly 275 280 285	864
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gac caa atg gca gcg tac aag atg aac aaa ctt cac ctt cac cta acc Asp Gln Met Ala Ala Tyr Lys Met Asn Lys Leu His Leu His Leu Thr 355 360 365	1104
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PAGE ONE OF ONE

tac ttc agc aaa gca gac tac gtg gaa atc ttg aaa tac gcg aaa gca Tyr Phe Ser Lys Ala Asp Tyr Val Glu Ile Leu Lys Tyr Ala Lys Ala 420 425 430	1296
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att	gtt	tct	aac	cca	gat	tac	gtg	tac	atg	gat	atg	cca	tac	gaa	gtt	2016	
Ile	Val	Ser	Asn	Pro	Asp	Tyr	Val	Tyr	Met	Asp	Met	Pro	Tyr	Glu	Val		
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gac	ccg	aaa	gag	cgt	ggt	tac	tac	tgg	gca	aca	cgt	gca	acg	gat	act	2064	
Asp	Pro	Lys	Glu	Arg	Gly	Tyr	Tyr	Trp	Ala	Thr	Arg	Ala	Thr	Asp	Thr		
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cgt	aag	atg	ttt	ggc	ttt	gca	cca	gag	aac	atg	cct	caa	aac	gca	gaa	2112	
Arg	Lys	Met	Phe	Gly	Phe	Ala	Pro	Glu	Asn	Met	Pro	Gln	Asn	Ala	Glu		
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Thr	Ser	Val	Asp	Arg	Asp	Gly	Asn	Gly	Phe	Thr	Gly	Lys	Gly	Glu	Ile		
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aaa	gtt	gtt	gtt	gag	tac	tcg	caa	aac	tct	aat	cta	gtt	gat	aaa	gca	2352	
Lys	Val	Gly	Val	Glu	Tyr	Ser	Gln	Asn	Ser	Asn	Leu	Val	Asp	Lys	Ala		
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tcg	cta	aac	caa	gac	tac	aac	cgc	ttt	gcg	aac	gta	ctt	ggt	caa	cgt	2400	
Ser	Leu	Asn	Gln	Asp	Tyr	Asn	Arg	Phe	Ala	Asn	Val	Leu	Gly	Gln	Arg		
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Glu	Leu	Ala	Lys	Leu	Glu	Lys	Ser	Gly	Ile	Asp	Tyr	Arg	Leu	Pro	Val		
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cca	ggt	gca	aaa	gta	gaa	gat	ggt	aag	cta	gca	atg	aac	gtt	cag	ttc	2496	
Pro	Gly	Ala	Lys	Val	Glu	Asp	Gly	Lys	Leu	Ala	Met	Asn	Val	Gln	Phe		
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cct	ggc	gta	acg	ctt	caa	tac	tct	ctg	gat	ggt	gag	aac	tgg	ttg	act	2544	
Pro	Gly	Val	Thr	Leu	Gln	Tyr	Ser	Leu	Asp	Gly	Glu	Asn	Trp	Leu	Thr		
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tat	gca	gac	aac	gct	cgt	cca	aat	gta	act	ggt	gaa	gtc	ttc	atc	cgc	2592	
Tyr	Ala	Asp	Asn	Ala	Arg	Pro	Asn	Val	Thr	Gly	Glu	Val	Phe	Ile	Arg		
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tcg	gta	tct	gcg	aca	ggt	gag	aag	gta	agc	cgt	atc	act	agc	gtg	aaa	2640	
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875

880

2643

taa

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<220>
<223> dnaA/Chitobiase Fusion

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50 55 60
Asn Met Thr Leu Val Asn Gln Gly Glu Ala Val Asp Ser Lys Asp Trp
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Ala Ile Tyr Phe His Ser Ile Arg Leu Ile Leu Asp Val Asp Asn Glu
85 90 95
Gln Phe Lys Ile Ser Arg Val Thr Gly Asp Leu His Lys Leu Glu Pro
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Thr Asp Lys Phe Asp Gly Phe Ala Ala Gly Glu Val Val Leu Pro
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Leu Val Gly Glu Tyr Trp Gln Leu Phe Glu Thr Asp Phe Met Pro Gly
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Leu Lys Arg Thr Pro Asp Asp Asn Val Phe Ala Asn Ala Val Ser
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Arg Phe Glu Lys Asn Glu Asp Leu Ala Thr Gln Asp Val Ser Thr Thr
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210 215 220
Ile Ala Asp Gly Ile Ala Leu Pro Lys Asp Ala Phe Asp Ala Thr Gln
225 230 235 240
Phe Ala Ala Ile Gln Asp Arg Ala Glu Val Val Gly Val Asp Val Arg
245 250 255
Gly Asp Leu Pro Val Ser Ile Thr Val Val Pro Ala Asp Phe Thr Gly
260 265 270
Glu Leu Ala Lys Ser Gly Ala Tyr Glu Met Ser Ile Lys Gly Asp Gly
275 280 285
Ile Val Ile Lys Ala Phe Asp Gln Ala Gly Ala Phe Tyr Ala Val Gln
290 295 300
Ser Ile Phe Gly Leu Val Asp Ser Gln Asn Ala Asp Ser Leu Pro Gln
305 310 315 320
Leu Ser Ile Lys Asp Ala Pro Arg Phe Asp Tyr Arg Gly Val Met Val
325 330 335
Asp Val Ala Arg Asn Phe His Ser Lys Asp Ala Ile Leu Ala Thr Leu

DRAFT - 08/02/00

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Asp Gln Met Ala Ala Tyr Lys Met Asn Lys Leu His Leu His	Lys Leu Thr	
355	360	365
Asp Asp Glu Gly Trp Arg Leu Glu Ile Pro Gly Leu Pro	Glu Leu Thr	
370	375	380
Glu Val Gly Ala Asn Arg Cys Phe Asp Thr Gln Glu Lys Ser	Cys Leu	
385	390	395
Leu Pro Gln Leu Gly Ser Gly Pro Thr Thr Asp Asn Phe	Gly Ser Gly	400
405	410	415
Tyr Phe Ser Lys Ala Asp Tyr Val Glu Ile Leu Lys Tyr	Ala Lys Ala	
420	425	430
Arg Asn Ile Glu Val Ile Pro Glu Ile Asp Met Pro Ala	His Ala Arg	
435	440	445
Ala Ala Val Val Ser Met Glu Ala Arg Tyr Asp Arg	Leu Met Glu Glu	
450	455	460
Gly Lys Glu Ala Glu Ala Asn Glu Tyr Arg Leu Met Asp	Pro Gln Asp	
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Thr Ser Asn Val Thr Thr Val Gln Phe Tyr Asn Lys Gln	Ser Phe Ile	480
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Glu Val Ala Ala Met His Gln Glu Ala Gly Ala Pro	Leu Thr Thr Trp	
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His Phe Gly Gly Asp Glu Ala Lys Asn Ile Lys Leu	Gly Ala Gly Phe	
530	535	540
Gln Asp Val Asn Ala Glu Asp Lys Val Ser Trp Lys	Gly Thr Ile Asp	560
545	550	555
Leu Ser Lys Gln Asp Lys Pro Phe Ala Gln Ser Pro	Gln Cys Gln Thr	
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Leu Ile Thr Asp Gly Thr Val Ser Asp Phe Ala His	Leu Pro Ser His	
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Phe Ala Glu Glu Val Ser Lys Ile Val Ala Glu Lys	Gly Ile Pro Asn	
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Phe Gln Ala Trp Gln Asp Gly Leu Lys Tyr Ser Asp	Gly Glu Lys Ala	
610	615	620
Phe Ala Thr Glu Asn Thr Arg Val Asn Phe Trp Asp	Val Leu Tyr Trp	640
625	630	635
Gly Gly Thr Ser Ser Val Tyr Glu Trp Ser Lys Lys	Gly Tyr Asp Val	
645	650	655
Ile Val Ser Asn Pro Asp Tyr Val Tyr Met Asp Met	Pro Tyr Glu Val	
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Asp Pro Lys Glu Arg Gly Tyr Tyr Trp Ala Thr Arg	Ala Thr Asp Thr	
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Arg Lys Met Phe Gly Phe Ala Pro Glu Asn Met	Pro Gln Asn Ala Glu	
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Thr Ser Val Asp Arg Asp Gly Asn Gly Phe	Thr Gly Lys Gly Glu Ile	
705	710	715
Glu Ala Lys Pro Phe Tyr Gly Leu Ser Ala Gln	Leu Trp Ser Glu Thr	720
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Val Arg Asn Asp Glu Gln Tyr Glu Tyr Met Val Phe	Pro Arg Val Leu	
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Lys Val Gly Val Glu Tyr Ser Gln Asn Ser Asn	Leu Val Asp Lys Ala	
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		800

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Pro Gly Val Thr Leu Gln Tyr Ser Leu Asp Gly Glu Asn Trp Leu Thr
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Tyr Ala Asp Asn Ala Arg Pro Asn Val Thr Gly Glu Val Phe Ile Arg
850 855 860
Ser Val Ser Ala Thr Gly Glu Lys Val Ser Arg Ile Thr Ser Val Lys
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18

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Sub A
Concluded